Review Article

# Ascariasis in South Asia: Major Manifestations of Surgical Importance

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**Abstract**

**Introduction:** Since a quarter of world's population reportedly affected by Ascariasis round worm being endemic in south east Asian subcontinent like gangetic plain of Bangladesh, West Bengal, Kashmere valley etc. Biliary ascaiasis is one of the manifestation of round worm infestation.

**Objective:** We conducted this retrospective study based on literature review available over the mid 2000 using the search key biliary Ascariasis, Biliary colic, Acute cholecystitis, obstructive jaundice, cholangitis, pancreatitis, hepatolithiasis, liver abscess. The search engine used was: Pubmed, Google Schoalr, HINARI, Embase and Scopus. We searched literature published from both endemic and non endemic area and aimed to study different types of clinical presentation, diagnostic tool, complications and their frequency and various treatment option for the management of biliary ascariasis.

**Result:** Biliary colic is the commonest symptom. Acute cholecystitis, obstructive jaundice, cholangitis, pancreatitis, hepatolithiasis, liver abscess are other mode of presentation. Ultrasonography was reported to be an excellent non –invasive investigation for proper diagnosis and follows up in such conditions. Majority of cases are treated conservatively. ERCP (Endoscopic Retrograde Cholangio Pancreatography) based extraction of Ascaris lubricoids is possible in most of the situation where expert endoscopy services are available.

**Conclusion:** Open common bile duct exploration and removal of worm is necessary in absence of endoscopy .Improvement of personal hygiene, improvement of sanitation and regular anti-helminthic administration can reduce these dreadful consequences of infestation by worms.

**Key words:** Biliary ascariasis, Endoscopic Retrograde Cholangio Pancreatography, Common bile duct exploration.

## Introduction

Ascaris lumbricoides, a nematode, is the causative agent of ascariasis. It is the most common helminthic infestation in the world. Ascaris infestations are prevalent mainly in developing countries. People from lower socioeconomic group living in poor hygienic condition in rural areas are victim of this condition.

Adult worm normally lives in small intestine. They love to wander and tend to explore ducts and cavities. The adult worm often enters bile and pancreatic duct and cause obstruction to the flow of bile or pancreatic juice. After gall stone, biliary ascariasis is the second most common cause of acute biliary symptom worldwide.[1] Female and children are mostly affected. Acute upper abdominal colic is the commonest symptom. In endemic areas biliary ascariasis is a frequent diagnosis and should be kept in mind for acute upper abdominal pain. Mainstay of diagnosis is ultrasonography. Most of the patient can be managed conservatively. Failure of conservative treatment will require worm extraction by ERCP or common bile duct exploration.

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**Presentation of biliary ascariasis in various studies Table-1, Source[2]**

| Presentation /Complication | Percentage |
|---|---|
| Abdominal or biliary colic | 97% |
| Acute cholangitis | 15.5% |
| Obstructive jaundice | 9% |
| Acute pancreatitis | 6.5% |
| Choledocholithiasis | 6.5% |
| Acute cholecystitis | 6.5% |
| Liver abscess | 2.5% |

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**Table -2:** Source[1].

| Presentation /Complication | Percentage |
|---|---|
| Abdominal or biliary colic | 95% |
| H/O cholecystectomy | 80% |
| H/O Sphincterotomy | 77% |
| Acute cholangitis | 17% |
| Obstructive jaundice | 28% |
| Acute Pancreatitis | 2.5% |
| Hepatic abscess | 2.5% |

**Table-3:** Source[3]

| Presentation /Complication | Percentage |
|---|---|
| Abdominal or biliary colic | 80% |
| Cholecystitis | 30% |
| Obstructive jaundice | 25% |
| Acute cholangitis | 5% |
| Acute Pancreatitis | 5% |
| Hepatic abscess | 5% |

**Table-4:** source[10]

| Presentation /Complication | Percentage |
|---|---|
| Abdominal or biliary colic | 98% |
| H/O cholecystectomy | 80% |
| H/O Sphincterotomy | 77% |
| H/O Worm emesis | 25% |
| Obstructive jaundice | 1.3% |
| Cholangitis | 16% |
| Pancreatitis | 4.3% |

**Diagnosis**

All patients with suspected biliary ascariasis are assessed with CBC, liver function tests, serum amylase, X-ray chest and abdomen and ultrasonography of the hepatobiliary system. Ultrasonography should be repeated to assess the progress of the worm, whether it has passed out of the biliary tract or migrated upwards. The mainstay of diagnosis is ultrasonography.[4] It has a very high accuracy for diagnosis and follows up of worm in the biliary tract. Various appearances of the worm has been described on ultrasonography. They are as follows:-

1) Inner tube sign- The worm may be seen as thick echogenic stripe with a central anechoic tube in the Gall bladder or common bile duct. (Fig-1)

2) Stripe sign-Thin non shadowing stripe without and inner tube within the biliary tract. (Fig-2)

3) Spaghetti sign-Multiple long linear overlapping echogenic structure due to coiling of a single worm or multiple worms.

4) Mobile structure-The sonography may demonstrate mobility of the worm in the gall bladder or the biliary channel and unequivocally establishing the diagnosis.[4,5]

5) Amorphous appearance- Degraded worm may appear as amorphous, echogenic filling defect making the diagnosis diflcult.

6) Dilated intra and extrahepatic ducts will be present with any of the above mentioned feature.


**Fig.-1:** Inner tube sign on USG

**Fig.-2:** Stripe sign

### Treatment

All patients are initially managed conservatively with intravenous fluid, antibiotics, analgesic and antispasmodic medication. Patients are followed by repeated ultrasound to monitor the progress of the worm. Majority of patients respond to this conservative therapy.

Failed conservative treatment should have worm extraction by ERCP if available or by open choledochotomy. In case of associated inflamed gall bladder cholecystectomy should also be done. Liver abscess or perforation of hollow viscus will require surgical exploration.

All patients should be de-wormed with 400 mg Albendazol repeated every 6 months.

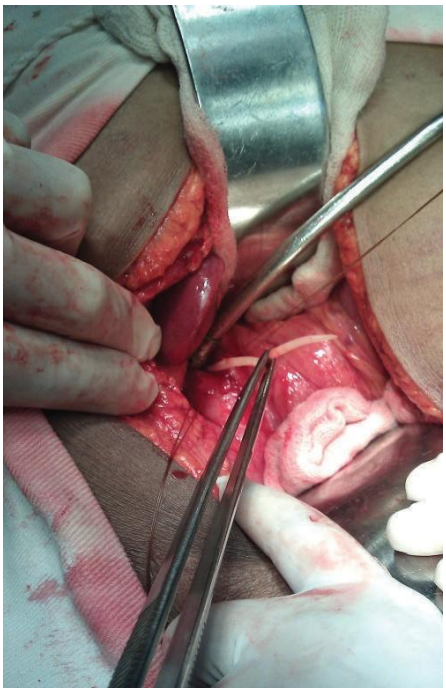

**Fig.-3:** Extraction of AL by Choledochotomy


**Fig.-4:** ERCP view of biliary ascariasis

### Discussion

Biliary ascariasis is commonly reported from Far-east, Indian subcontinent, Middle East, Latin America and Africa. In human the usual habitat is small intestine. When the worm load is high the worm tends to migrate out of the usual site of their habitat and tends to enter ducts and cavities.[1]

Symptoms of biliary colic occur when the worm migrates across the papilla in the duodenum. The worm may remain in the bile duct, may reach the gall bladder or even reach the hepatic parenchyma. As soon as it enters the bile duct colicky pain starts. If it stays in the biliary tract further complication may occur. Common complications noted in different series are cholangitis, stricture, calculi, cholecystitis, perforation of the CBD or gall bladder, [6] pancreatitis and liver abscess.

Women are 4 to 6 time more affected than men. The reason behind the preponderance of female population is not exactly known. Young and middle aged female possess high level of progesterone hormone. One of the actions of progesterone is relaxation of smooth muscle. Relaxation of smooth muscle of sphincter of Oddi allows worms to gain easy entrance into the common bile duct.[11] recurrent duct invasion has been observed in the endemic region. Re-invasion rate has been found to be about 15%. Previous surgery of the biliary tract predisposes to biliary ascariasis. Cases are reported after sphincterotomy and Roux-en-Y hepatico-jejunostomy.[7] Prior cholecystectomy also predisposes to bile duct invasion by ascariasis. After cholecystectomy common bile duct and other biliary ducts get dilated. Rise in the level of cholecystokinin leads to relaxation of sphincter of Oddi. All these factors help entry of ascaris into the biliary tree.[8]

For diagnosis of biliary ascariasis ultrasound was described to have very high accuracy in most of the series. It is an excellent tool for monitoring progress of the worm in the biliary tree. Its accuracy was found to be around 100% in various series. ERCP has both diagnostic and therapeutic value.

Most of the series described high success of conservative treatment. Its reported eflcacy ranges between 70 to 90%.[3,9] All patients should be monitored by serial ultrasonography. Mostly patients improve on the conservative treatment within 4-5 days. Conservative treatment should not be continued for more than 10 days. Otherwise retained and degraded worms may lead to dreadful complication like CBD perforation, gall

bladder perforation, cholangitis, liver abscess, which are diflcult to manage.[6] If facility for endoscopic extraction is available therapeutic intervention should be done earlier. Mobbing Khan et al and Annand BS et al demonstrated high success rate with wide papillotomy and endoscopic extraction in their series. They were successful in extraction of worm from the biliary tract around 95% of cases. They did not experience any major complication during or following the procedure.[2, 10, 11] Unavailability of ERCP will require surgical exploration of CBD and removal of the worm. Most of the surgeons likes to put T-tube drainage after CBD exploration. In my experience a much dilated CBD can be closed primarily without T-tube drainage. Associated complication like liver abscess or cholecystitis can be dealt with at the time of surgical exploration.

## Conclusion

In endemic areas biliary ascariasis should be suspected in female and young patients with upper abdominal pain. Ultrasound should be done for evaluation and follow up. Though majority of patients improve on conservative management, early intervention by ERCP should be done, if facility is available. Conservative treatment should be abandoned in favor of surgery if worm does not come out of the biliary tract within 10 days. All patients must have regular de-worming as re-invasion rate is also very high in endemic area.

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